APPENDIX I

ENDANGERED SPECIES CONSULTATION AND FISH AND WILDLIFE COORDINATION ACT REPORT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
6620 Southpoint Drive South
Suite 310
Jacksonville, Florida 32216-0912

IN REPLY REFER TO:
FWS/R4/ES-JAFL

SEP 22 1999

James C. Duck
Chief, Planning Division
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Duck:

This draft planning-aid letter is provided in response to your letter of April 26, 1999, requesting that alternatives related to the Alafia River Navigation Feasibility Study be evaluated beyond those addressed in the Fish and Wildlife Coordination Act Report (CAR) submitted to the Corps in December 1998. That report described the proposed project, the project area, fish and wildlife resources in the project area, project-related effects on those resources, and identified and recommended beneficial use projects for the dredged material. The CAR also included a biological opinion regarding the effects of the proposed project on the Florida manatee (*Trichechus manatus latirostris*). The CAR specifically discussed the expansion of the Alafia River Navigation Channel, expansion of the turning basin, dredged material disposal for wetland development at CMDA-2D, filling holes at MacDill Air Force Base and Port Redwing, and creating bird habitat at Bird Island (Alafia Banks).

The specific alternatives that will be addressed in this draft planning-aid letter are wetland development adjacent to CMDA-2D, the use and expansion of two Cargill dredged material management areas, and open bay disposal for the purpose of creating a recreational destination island at Long Shoal in Hillsborough Bay. The comments offered in this amendment are additions to those offered in the December 1998 CAR and do not supercede them. Please note that the figure and literature citations referenced below will be included in the final planning aid letter.

Description of the study area

CMDA-2D

Disposal island CMDA-2D (2D) is a confined disposal site of about 650 acres that was created from open bay disposal in Hillsborough Bay. The proposed marsh creation project would abut its southeast shoreline, extending about 1,500 feet to the east and running about 3,900 feet north

from 2D's south shoreline. About 100 acres would be incorporated in the proposed construction. Black and red mangrove (*Avicennia germinans* and *Rhizophora mangle*, respectively) are present on 2D's shoreline and on the small island to its east that would be incorporated into the marsh. The marsh would be built on a shelf that currently varies in depth from intertidal to about 5 feet deep. This area consists of unconsolidated substrate with no submerged aquatic vegetation. Examples of fish species sampled from this type of habitat in Tampa Bay are shown in Table 1.

Hillsborough Bay is considered the most impacted segment of Tampa Bay as manifested by water quality (Lewis and Estevez 1988; Squires and Cardinale 1996) and altered tidal flow and prism (Goodwin 1987). Squires and Cardinale (1996) reviewed data on salinity, Secchi disk depth, turbidity, dissolved oxygen concentration, total phosphorus, total nitrogen, and chlorophyll-*a* concentrations as water quality indicators. Secchi disk depth and turbidity are two measures of water clarity, which is important for determining the depth of photosynthesis and allowing visually oriented organisms to find food and shelter. Dissolved oxygen is necessary for the vast majority of organisms to live and its concentration is one of the most important factors controlling the distribution of aquatic organisms; concentrations below four parts per million (ppm) are marginal for supporting aquatic life. Phosphorus and nitrogen are nutrients necessary for the survival and growth of aquatic plants with their availability and relative concentrations affect the types and quantities of plants in aquatic systems. Chlorophyll-*a* concentration is an indicator of phytoplankton productivity and serves as an indicator of nutrient loads and fluxes. Hillsborough Bay typically had shallower Secchi disk depths, lower dissolved oxygen concentrations, and greater turbidity, total phosphorus, total nitrogen, and chlorophyll-*a* concentrations than other segments of the bay, leading to their conclusion that Hillsborough Bay was the most impacted segment of the bay.

Cargill Disposal Areas

Cargill's disposal area A is about 1 mile south of the Alafia River, west of Lula Road, Gibsonton (Figure 1). It is about 31 acres and receives dredge material from maintenance dredging of the Alafia River Navigation Channel. The proposed expansion would be to the north and west of the existing cell, covering about 46 acres and would impact examples of many of the coastal habitats found around Tampa Bay. Mangrove communities, salterns, black needlerush marsh, and coastal upland hammock communities are all present in the footprint of the proposed expansion.

Immediately west of the disposal area is saltern habitat. Stunted black mangrove, saltwort (*Batis maritima*), glasswort (*Salicornia bigelovii*), sea purslane (*Sesuvium portulacastrum*) and key grass (*Monanthochloe littoralis*) grow intermixed around areas of bare sand. Mangroves dominate the area between the saltern habitat and Tampa Bay. Black and white mangrove (*Laguncularia racemosa*) are the dominant vegetation. To the northwest of the existing disposal site, black needlerush (*Juncus roemerianus*), sea oxeye (*Borrichia frutescens*) and salt grass (*Distichilis spicata*) become common and become intermixed with coastal hammock habitats to their east. Sabal palm (*Sabal palmetto*), saw palmetto (*Serenoa repens*), wax myrtle (*Myrica cerifera*) and oaks (*Quercus* sp.) dominate the hammock community. Brazilian pepper (*Schinus*

terebinthifolius) and punk tree (*Melaleuca quinquenervia*) are common invasive species that are found on the site.

High marsh, exemplified by the black needlerush marsh, and saltern habitats were identified by the Tampa Bay National Estuary Program (Tampa Bay National Estuary Program 1996a) as having been lost in greater proportion that other coastal habitats. Restoring their proportional acreage to the bay is a priority of the Comprehensive Conservation and Management Plan for Tampa Bay (CCMP) (Tampa Bay National Estuary Program [TBNEP] 1996b). Coastal marsh contributions to nutrient cycling (Stickney 1984, Day *et al.* 1989) and their use by estuarine natural resources (Durako *et al.* 1988, Lewis and Estevez 1988) highlight the importance of this habitat to estuarine productivity. Shrimp (*Penaeus* spp.), blue crab (*Callinectes sapidus*), mullet (*Mugil* spp.) and red drum (*Sciaenops ocellatus*) are examples of commercial and recreational fisheries species that spend part of their life cycles in coastal marsh systems. Salterns provide foraging, loafing and nesting habitat for many species of shorebirds and wading birds. The biological importance and productivity of mangrove communities are well documented for Florida (Odom and McIvor 1990) and for Tampa Bay (Lewis and Estevez 1988). They provide many ecological functions such as soil stabilization, nutrient cycling and habitat for recreationally and commercially important fish and wildlife species.

Disposal Area C is located on the north side of the Alafia River, west of Cargill's plant (Figure 1). The proposed expansion would cover about 10 acres to the east of the existing disposal area. The majority of the area to be covered is a freshwater wetland that is a storm water detention pond, an integral part of the plant's storm water management program.

About 7 acres of the proposed expansion site are wetland, with the remainder being highly altered uplands. The value of the wetland for migratory waterbirds is well known locally (Mike Wells, Cargill, personal communication; Ann Schnapf, National Audubon Society, personal communication). A site visit by a Service biologist on August 11, 1999 provided a snapshot of the bird species that rely on the site (Table 2).

The species observed provide insight into the diversity of wetland habitats available for wildlife resources. The site provides habitat for species that feed in open water, that wade in deep and shallow water, that probe relatively vegetation-free shallow flats, and that feed in inundated marsh surface with relatively dense vegetation. Much of the wetland shoreline is maintained and is covered with short grass. Shrubby vegetation is scattered along the shore in small patches and is composed of Brazilian pepper, wax myrtle, and saltbush (*Baccharis halimifolia*). A few cattails (*Typha latifolia*) are present along the north shoreline and in the northern section of the wetland.

Long Shoal

Long shoal is proposed as a site to construct a recreational destination island for boaters. Located around 27° 52.198' North, 082° 27.935' West, in Hillsborough Bay, it is relatively long and slender with its long axis lying roughly northeast to southwest. It is about 5,400 feet long and averages

about 900 feet wide, an area of about 111 acres. Depths of Long Shoal range from about 1 to 6 feet with the adjacent bay bottom being about 8 to 12 feet deep. The bay bottom around Long Shoal is unvegetated fine materials (Tom Cardinale personal communication). On a site visit on August 17, 1999 a Service biologist noted an extensive oyster (*Crassostrea virginica*) reef on the shoal. The reef's persistence was evidenced by the multiple layers of oysters over 4" long. The oysters examined on August 17 were all over 4" long and covered with epiphytic organisms.

American oysters (*Crassostrea virginica*) are one of the most visible and well studied species of estuarine benthic organisms. They have not been extensively studied in Tampa Bay, although their commercial harvest in Tampa Bay was second only to the harvest from Apalachicola Bay through the 19th century (Lewis and Estevez 1988). The Tampa Bay industry was gone by 1970. Oyster beds are important components of estuarine systems not only for their commercial value but also their functional value. Oysters filter and clean the water passing across them and build reefs that provide habitat for many other organisms. Bahr and Lanier (1981) reported that up to 50m^2 of shell surface was available for epifauna for each square meter of oyster reef surface and found 42 species of invertebrates associated with the reef. Although they reported on a reef community in Georgia, most of the species noted are also present in Tampa Bay and it is reasonable to expect that they are associated with Tampa Bay oyster reefs also.

Discussion

The contribution of intertidal habitats to estuarine productivity are well known and documented (Stickney 1984, Durako *et al.* 1988, Lewis *et al.* 1988, Day *et al.* 1989) and restoring lost intertidal habitat acreage is a priority of the CCMP (TBNEP 1996b). The existing habitat is not without value, however. Waterbirds use 2D for nesting, and fledging young may be found along the shoreline. Additionally, species such as terns, gulls, cormorants and pelicans use the open water as foraging habitat. Both the open water habitat and fringing mangroves provide habitat for numerous fish species. Expansion of 2D should only be undertaken after detailed analysis of its impact on circulation and tidal flow in Hillsborough Bay (which is already the most heavily impacted segment of Tampa Bay), and a comprehensive assessment of impacts to existing natural resource values.

Taken in its entirety, the area proposed for expanding disposal area A offers a mosaic of habitats that are essential components of a healthy and productive Tampa Bay system. Habitats from coastal hammock to intertidal marsh and mangroves would be lost to the expansion. Their historic decreases have been documented and the necessity of protecting, enhancing and restoring them is a priority of many private citizens, non-governmental organizations, and local, state and federal governmental agencies. The expansion of disposal area C will result in the irretrievable loss of important habitat for Tampa Bay.

The habitats that would be lost to expanding disposal area C are freshwater wetlands that are important for migratory and nesting birds. Chick survival of many waterbirds is low when they are fed exclusively on forage from estuarine or marine environments. Therefore, many waterbirds

that nest in saline environments depend on nearby freshwater wetlands for foraging in order to successfully fledge their young. It will be important to replace the wetland habitats lost if disposal area C is expanded. There is vacant disturbed land immediately north of the existing wetland and outside the footprint of the proposed expansion that may be suitable for creating wetland habitats. Soil analyses would have to be conducted for environmental contaminants before a decision on its suitability could be made.

Long Shoal is proposed as a site to construct a recreational destination island in the segment of Tampa Bay that has experienced the greatest change from historic conditions in tidal flow and prism because of human activities. A large portion of the shoal is covered by oyster beds that are productive estuarine features. They would either have to be avoided or relocated to a site that has the demonstrated ability to support mature oyster beds. The oyster reefs can be mapped and the results could show that sufficient area remains to construct the island. Boaters visiting the island would place the oysters and themselves at risk. Boats crossing the reefs could easily run aground on the reefs, destroying both the boat and the reef. Shallow draft vessels, such as jet skis, can cross the reefs without contact, but anyone falling off could be seriously injured on the sharp oyster shells. Constructing an island on Long Shoal would impact productive estuarine habitats and have the potential of creating an attractive nuisance for recreationists.

Summary

Widening and deepening the Alafia River Channel and Turning Basin will result in the need to dispose of about 5 million cubic yards of dredged material. Several disposal alternatives were addressed in the Final Fish and Wildlife Coordination Act Report (CAR) submitted to the Corps in December 1998. This letter has examined four additional alternatives. Our CAR recommended that beneficial use alternatives are the preferred disposal option for this project and that remains our recommendation, when the benefits are clearly shown. Absent a more thorough evaluation of the potential benefits and adverse effects, it is not possible to determine whether the marsh expansion adjacent to 2D or the island creation at Long Shoal could be clearly identified as beneficial use projects. Beneficial use projects need to be evaluated in the context of bay-wide needs and their contribution to the long-term needs of dredge material disposal.

Specific comments and recommendations regarding the four alternatives addressed in this letter follow:

- Creating intertidal habitats adjacent to 2D may be shown to be a beneficial use project if the natural resource benefits can be clearly defined, tidal flow and circulation questions concerning Hillsborough Bay can be answered, and a conservation easement is placed on the expansion to protect any intertidal habitats created;

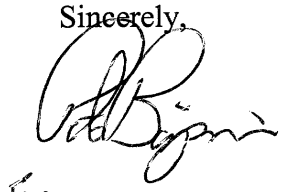
- Expanding Cargill disposal area A will cause unmitigable and irretrievable losses of essential Tampa Bay coastal habitats;

- Expanding Cargill disposal area C will destroy important freshwater wetlands that would need to be replaced with wetlands of equal value on-site; and,

- Creating a recreational destination island at Long Shoal may result in the loss of highly productive oyster reefs and create an attractive nuisance for recreationists.

The above comments represent our draft planning aid letter regarding the proposed alternatives. We will provide a final planning aid letter upon receiving your comments on this draft. We request your comments within 30 days of your receipt of this letter. Should you have any questions regarding these comments please contact Bryan Pridgeon at 727-570-5398, extension 13.

Sincerely,



For David L. Hankla
Field Supervisor

cc: NMFS
Game and Freshwater Fish Commission

Table 1. Examples of fish species from Tampa Bay subtidal, non-vegetated habitats of greater than 10‰ salinity. (Tampa Bay National Estuary Program 1996).

Common Name	Scientific Name
southern stingray	*Dasyatis americana*
cownose ray	*Rhinoptera bonasus*
hardhead catfish	*Arius felis*
sheepshead	*Archosargus probatocephalus*
silver perch	*Bairdiella chrysoura*
spot	*Leiostomus xanthurs*
Atlantic croaker	*Micropogonias undulatus*
red drum	*Sciaenops ocellatus*
mullet	*Mugil* spp.
common snook	*Centropomus undecimalis*

Table 2. Birds observed in wetland that would be filled under proposed expansion of disposal area C.

Common Name	Scientific Name
Brown Pelican	*Pelecanus occidentalis*
Double-crested Cormorant	*Phalacrocorax auritus*
Yellow-crowned Night-Heron	*Nycticorax violacea*
Tricolored Heron	*Egretta tricolor*
Little Blue Heron	*Egretta caerulea*
Snowy Egret	*Egretta thula*
Great Egret	*Casmerodius albus*
Great Blue Heron	*Ardea herodius*
Glossy Ibis	*Plegadis falcinellus*
White Ibis	*Eudocimus albus*
Common Moorhen	*Gallinula chloropus*
Black-necked Stilt	*Himantopus mexicanus*
Semipalmated Plover	*Charadrius semipalmatus*
Killdeer	*Charadrius vociferus*
Greater Yellowlegs	*Tringa melanoleuca*
Dowitchers	*Limnodromus sp.*
Sandpipers	*Calidris sp.*
Forster's Tern	*Sterna forsteri*
Least Tern	*Sterna antillarum*
Black Tern	*Chlidonias niger*

United States Department of the Interior

FISH AND WILDLIFE SERVICE
6620 Southpoint Drive South
Suite 310
Jacksonville, Florida 32216-0912

IN REPLY REFER TO:
FWS/R4/ES-JAFL

DEC 14 1998

A.J. Salem
Chief, Planning Division
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

FWS Log No: 98-737C (Tampa)

Dear Mr. Salem:

In accordance with the Fiscal Years 1996-97 Transfer Fund Agreement between the Fish and Wildlife Service and the Jacksonville District Corps of Engineers, this letter transmits the Final Coordination Act Report and Biological Opinion for the proposed Alafia River Main Shipping Navigation Channel Expansion and Turning Basin Project in Hillsborough County, Florida.

Previous draft copies of this report were sent to your office in February and September, 1997. The two reports have since been finalized and consolidated into one report. Copies are also being sent to the Environmental Protection Agency, National Marine Fisheries Service, Florida Department of Environmental Protection, Florida Game and Fresh Water Fish Commission, Hillsborough County Environmental Protection Commission, National Estuary Program of Tampa Bay, Tampa Baywatch, Tampa Bay Regional Planning Council, and National Audubon Society.

For further inquiry or assistance, please contact Ms. Deborah Manz at (813) 570-5398.

Sincerely,

Michael M. Bentzien

for David L. Hankla
Field Supervisor

TAMPA HARBOR-ALAFIA RIVER NAVIGATION CHANNEL FEASIBILITY STUDY HILLSBOROUGH COUNTY, FLORIDA

Fish and Wildlife Coordination Act Report

FINAL REPORT

Submitted to:
Department of the Army
Jacksonville District Corps of Engineers
Jacksonville, Florida

Submitted by:
Department of the Interior
U. S. Fish and Wildlife Service
Ecological Services
Jacksonville, Florida

December 1998

TABLE OF CONTENTS

1.0 INTRODUCTION

This represents the report of the U.S. Fish and Wildlife Service regarding the effects to existing fish and wildlife resources expected to result from the U.S. Army Corps of Engineers (Corps) proposed expansion of the Alafia navigation channel in Hillsborough County, Florida. The Service has evaluated the fish and wildlife resources of the study area and assessed project impacts, beneficial use for spoil material, and prepared a biological opinion for the Florida manatee. This study is authorized under Section 933 of the Water Resources Development Act of 1990.

2.0 PROJECT DESCRIPTION

The 3.6-mile Alafia channel is a federally maintained project which has a depth of 30 feet below mean low water (mlw), and a width of 200 feet. The channel has a turning basin that is 700 feet wide and 1,200 feet long. Preliminary investigations indicate that the Alafia River channel currently serves only the Cargill Fertilizer facility. The Water Resources Development Act (WRDA) of 1990 provides for future federal maintenance of a 34-foot project, if the existing 30-foot project is deepened by an additional 4 feet at non-federal expense. The cost for deepening will be incurred by local interests.

In accordance with the guidelines set forth in the EM-1110-2-1613 (1983), channel width criteria are 2.8 times the width of a Design Vessel Beam. This would require an additional 4 feet in depth, and an additional 25 feet in width on either side to accommodate the average 85-foot vessel beam. Although some vessels are larger, current users of the expanded Big Bend channel (250 ft.) are experiencing no significant problems.

This report identifies various potential locations for the disposal of dredged material, and provides recommendations and rankings for each site. These include island renourishment options, filling of marine dredge scars and channels, upland disposal, and littoral creation. The Corps will make the final location determination.

The Tampa Port Authority (TPA) has also requested the Tampa Harbor turning basin be expanded, and included in the Corps navigation channel expansion project. Subsequently, the Corps has submitted five design plans to the Service for review, with an additional request to evaluate the potential for beneficial use of remaining dredge material. This report includes our evaluation of the plans in terms of fish and wildlife resources, and recommendations for beneficial use of dredge material.

3.0 BACKGROUND

The Tampa Harbor-Big Bend Channel Navigation Feasibility Study (which includes the Alafia River) was requested by the Tampa Port Authority, and authorized by Senate and House

Resolutions adopted May 29, 1979, and November 14, 1979, respectively. The primary purpose of the Corps study was to determine the need for, and feasibility of, widening and deepening the Alafia River navigation channel, as well as disposing of the spoil material. The final report was completed in January, 1991. Previous studies and reports on the Alafia River are listed below:

Table 1. Prior studies and reports on the Alafia River, Florida.

Study Type	Report Date	Recommend-Chief of Engineers	Congressional Documents			
			Type	No.	Congress	Session
PE	2/5/1889	unfavorable	-	-	-	-
PE	2/17/1931	unfavorable	-	-	-	-
S	8/1/1940	favorable	S	16	77	1
S	5/19/1949	favorable	H	258	81	1

PE= Preliminary Examinations
S= Surveys
H= U.S. House of Representatives Documents
S= U.S. Senate Document

Existing Federal water projects in the study area include Tampa Harbor, which also includes the Alafia River navigation channel. Tampa Harbor provides a 43-foot channel to public phosphate terminals located in East Bay and Hillsborough Bay.

4.0 PROJECT AREA DESCRIPTION

Tampa Bay is Florida's largest open-water estuary, spanning almost 400 square miles, and receiving drainage from a 2200-square-mile watershed. A rich mosaic of habitats exist, which are highly productive in terms of wildlife resources. Tampa Bay has been a designated component of the National Estuary Program since 1990. Historically, Tampa Bay has suffered significant tidal and freshwater wetland losses due to uncontrolled development associated with a burgeoning population. This, in addition to nutrient loading from various point and non-point sources, overfishing, and irresponsible boating practices, has reduced the overall quality and quantity of aquatic resources and wildlife habitat (TNEP, 1996).

Hillsborough County is located in west central Florida and plays an integral role in the economy of the Tampa Bay region. Hillsborough Bay provides access and berthing facilities for international and national shipping firms which serve the phosphate, coal, and petrochemical industries. It is bounded by Polk County on the east, Tampa Bay on the south and southeast,

Pinellas County to the west, and Pasco County to the north. Historically, the bay has been plagued by contaminants. Urbanization and fertilizer runoff from berthing areas caused water quality degradation. The geographical confines of the Bay also contribute to the problem by restricting tidal flushing, and hence the cleansing action of the Bay. Water quality in the bay has improved significantly in recent years, as improvements in municipal waste water facilities, stormwater treatment, and industrial discharge have been implemented (TNEP, 1993).

The mouth of the Alafia River is located on the eastern shore of Hillsborough Bay approximately 6 miles south of the city of Tampa, just north of the town of Gibsonton (Figure 1). Nautically, it is located at mile 28 of the Tampa Harbor main shipping channel. A localized map of the project area is shown in Figure 2. The Alafia navigation channel connects the Alafia River to the main shipping channel in the middle of Tampa Bay. Two historic spoil islands (Sunken Island and Bird Island) exist just outside of the mouth of the river, and form the southern terminus of the channel. Two major spoil receptacles (islands 2D and 3D) built by the Corps, are located just to the north and south of the channel. A phosphate tailings stack is also located at the mouth of the Alafia on the north side of the channel.

4.1 WATER AND SEDIMENTS

Studies done by the Environmental Protection Commission of Hillsborough County (EPCHC), Manatee County, and Long *et al.* (1991), offer comprehensive information for stations near the proposed dredging area. The EPCHC information for Hillsborough Bay is based on yearly random samples of 4.4 hectare (11 acre) cells, to provide a bay "segment" perspective, versus exact locations (S. Grabe, pers. comm., 1998; G. Blanchard, pers. comm., 1996). An explanation of ratings and measurements given can be found in Boler (1996). Field work was done by biologists from the Service and EPCHC to provide the most current observations. Sample points were chosen based on the Corps proposed dredge areas, and were mainly in the shallows adjacent to the channel. No sample points were located in the channel itself, as access was limited and considered unsafe to dive. The following locations describe the current conditions of the areas being considered for dredging and restoration:

> Sample point 1: located approximately one-quarter mile west of the mouth of the Alafia River on the north side of the channel (Lat: 27.51.16N, Long: 82.24.43W) (Figure 3). Sampling occurred at a depth of 3 feet. Water clarity was approximately 2 feet. A water quality rating of "poor" is given to the immediate mouth of the river (S. Grabe, pers. comm., 1996). Sediments extracted from the bay bottom appeared to be predominantly gray sand with some shell hash, silts and organics (Figure 4). Observed aquatic species were Florida crown conch *(Melongena corona)* (Figure 5), jellyfish and tubeworms. Attached alga (*Gracilaria* spp.) were also present.

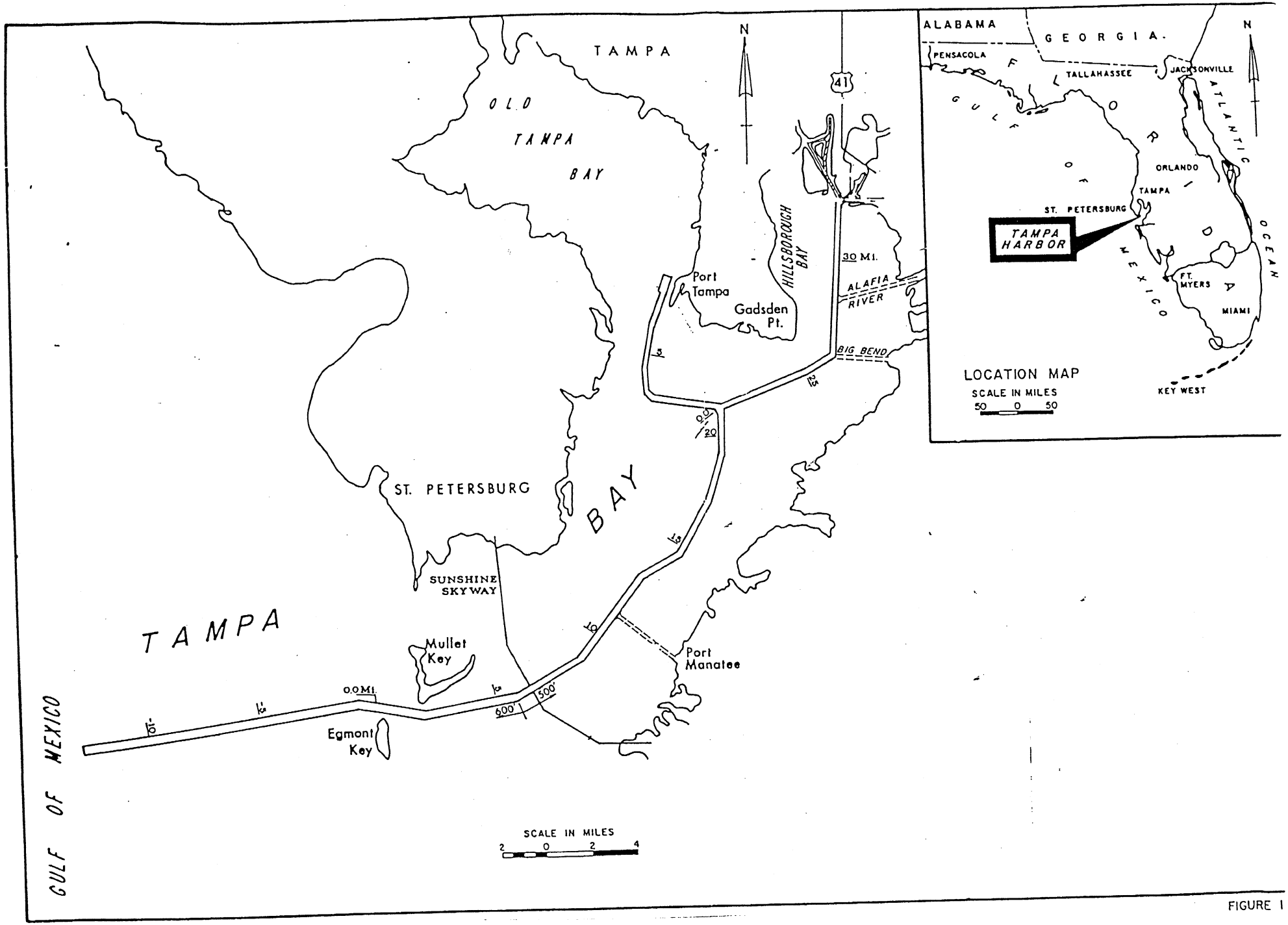


FIGURE 1

Figure 1. Tampa Bay, Florida, including navigation channels.

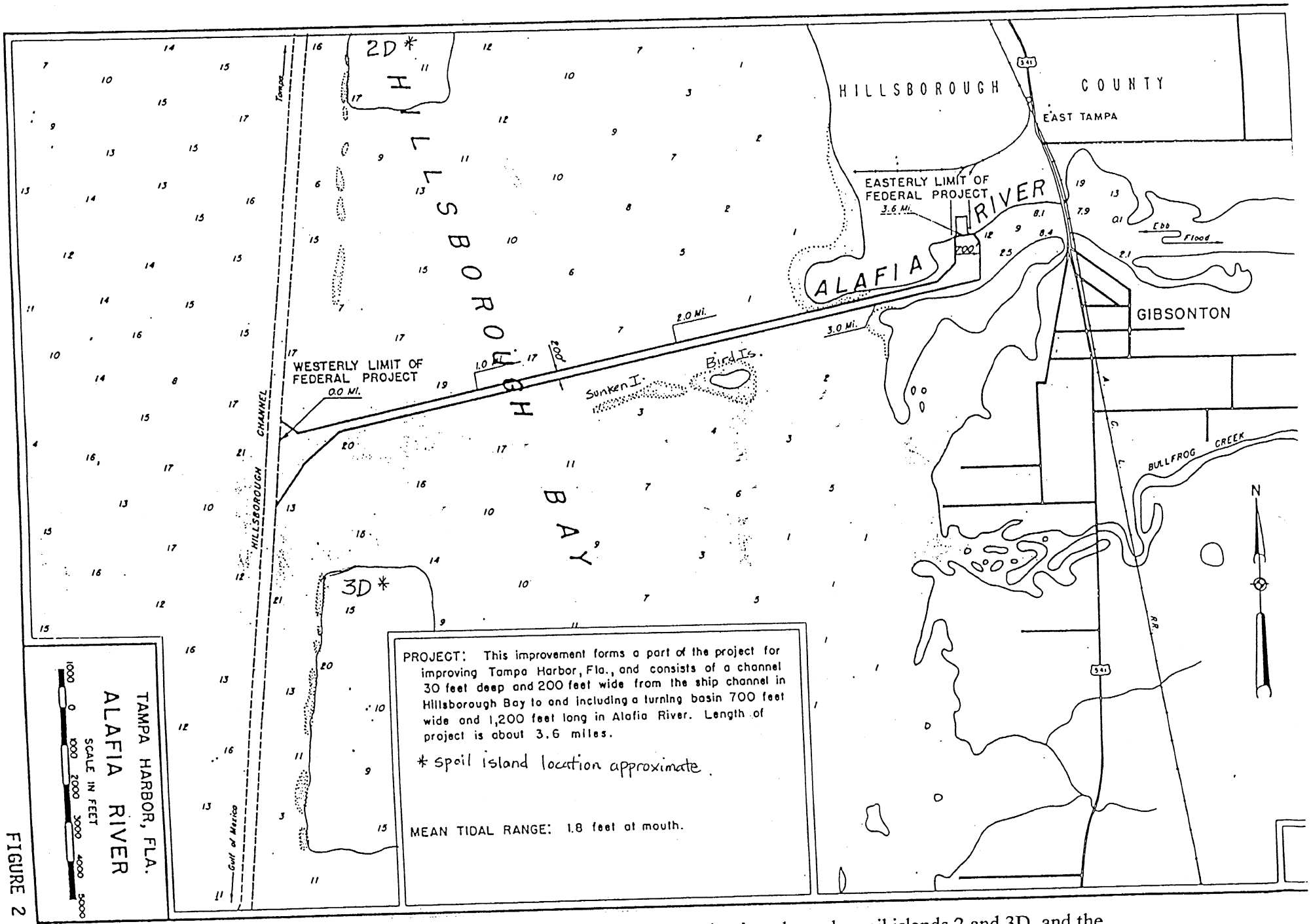


FIGURE 2

Figure 2. Project area: Alafia River and navigation channel, spoil islands 2 and 3D, and the Hillsborough Channel.

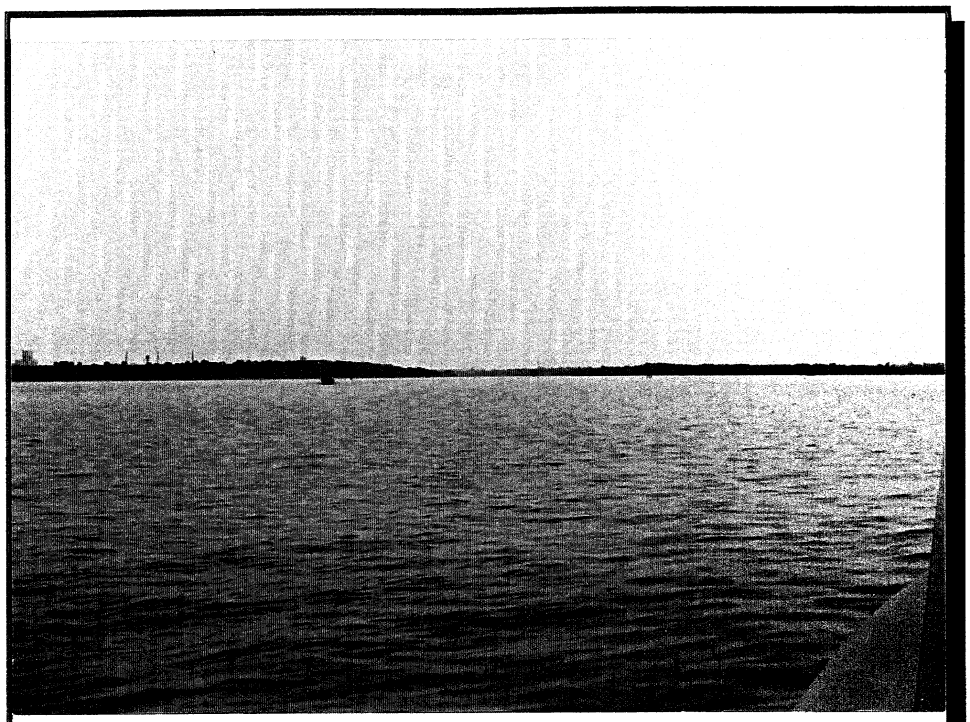


Figure 3. Sample points 1 and 2- mouth of the Alafia River

Figure 4. Sample point 1 - bay sediments

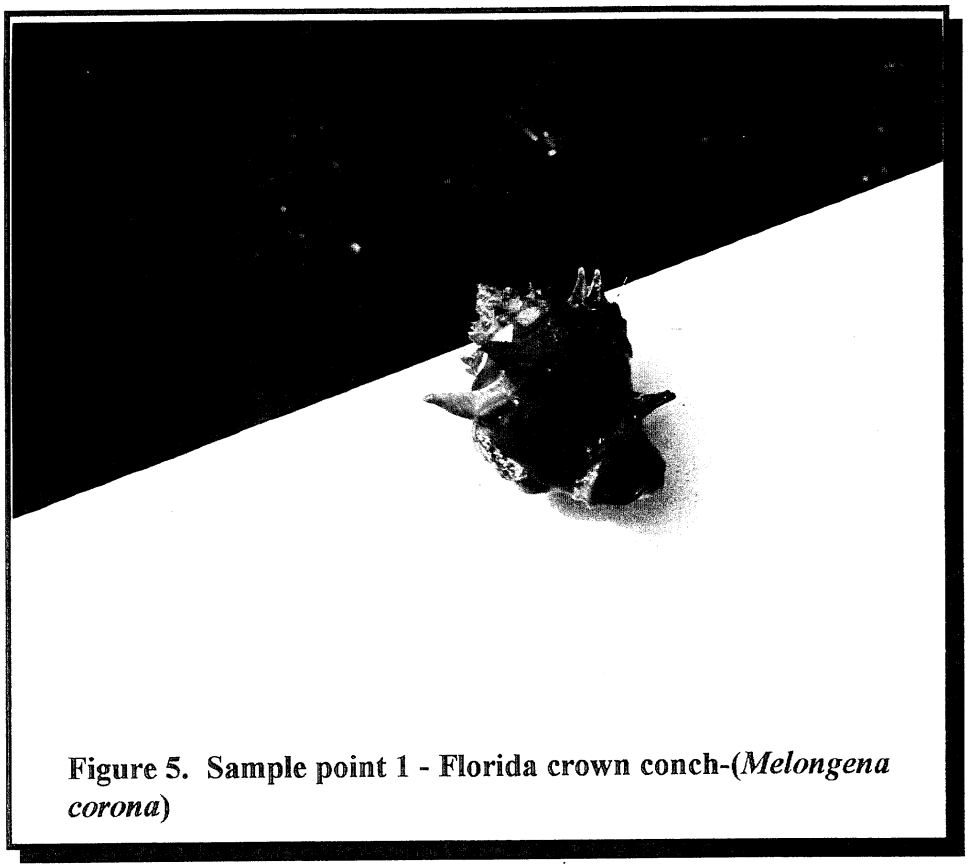


Figure 5. Sample point 1 - Florida crown conch-(*Melongena corona*)

Figure 6. Sample point 2 - bay sediments

Sample point 2: located directly across the channel on the south side and just north of Bird Island (Lat: 27.51.08N, Long: 82.24.41W) (Figure 3). Sampling occurred in 2.5 feet of water. Water clarity was approximately 2 feet. Water quality rates poor according to Grabe (pers. comm., 1996). Sediments extracted appeared sandy with minimal shell content, and dark with organics (Figure 6). EPCHC sediment information for these exact sites is not available, however, information is available for sites in close proximity to the sample points. Amphipods were present in the sediment samples collected by the Service. Examination of the substrate revealed an absence of seagrasses, but the presence of algae. Unidentified tubeworms were abundant. A pod of bottlenose dolphins (*Tursiops truncatus*) were also spotted in the shipping channel near marker 10.

EPCHC station HB36 (Lat: 27.86.0N, Long: 82.38.8W) is located in the general vicinity of the above sample points. Recorded sediment, pH, DO and salinity measurements for 1995 at 1 m depth are: 4.9% silts, 7.58 pH, dissolved oxygen of 0.81mg/l, and salinity of 19.4 ppt respectively. A low measurement of fines in this location is atypical for the bay as a whole, and is possibly due to station location. Strong currents from passing ships and daily tides may disperse or resuspend fines from the area (S. Grabe, pers. comm., 1996).

Station HB19 (Lat: 27.90.9N, Long: 82.47,45W) located in an upstream location from the project area, documents sediments and DO measurements as silt/clay content of 21.8%, and a dissolved oxygen level of 5.4 and 2.35 mg/l respectively, obtained at a depth of 3 m. The elevated level of fines is more typical of shallow, minimally disturbed areas, or places near freshwater outfalls.

4.2 DISSOLVED OXYGEN AND CONTAMINANTS

Low dissolved oxygen (DO) content results from a shortage of oxygen in bay waters caused by the influx of excess nutrients, which may trigger algae "blooms." Their subsequent decomposition increases oxygen demand, and may result in stress or elimination of aquatic species. Additionally, accumulated contaminants in bay sediments from industrial discharges and stormwater runoff renders portions of the bay unsuitable as wildlife habitat.

The EPCHC has conducted water quality monitoring since the mid-1970's. Results from 1986-1990 indicate deeper waters in lower Hillsborough Bay, and waters in the northern navigation channels have the lowest levels of dissolved oxygen. Station data taken from locations along the channel and in the mouth of the Alafia River indicate levels less than 5 mg/l, and are the lowest in Tampa Bay (Long *et al.,* 1991).

Sediments near the mouth of the Alafia contain elevated levels of cadmium, chromium, lead, mercury, zinc, and PCB's (Long *et al.*, 1991). This may result from activities occurring at the Cargill fertilizer plant. The combination of low DO and contaminant laden sediments create low quality wildlife habitat.

In summary, this area consists of varying sediment size, depressed dissolved oxygen levels, and elevated contaminant content. We recommend a more thorough investigation of the sediments to be dredged. This will allow a more thorough evaluation of the suitability of the dredged material for beneficial uses.

5.0 FISH AND WILDLIFE RESOURCES

On August 9, September 14 and 26, 1996, a Service biologist inspected the project area and areas adjacent to it. The purpose of these trips was to ascertain the effects of the proposed project on fish and wildlife resources, offer mitigation and management plans, and evaluate locations for beneficial use of spoil material.

The areas immediately adjacent to the Alafia channel are comprised of spoil islands, saltwater shallows, mudflats, mangrove forests, and high and low saltmarsh. This landscape provides habitat for a myriad of aquatic and terrestrial species.

5.1 RESOURCES OF CONCERN IN THE PROJECT AREA

Macroinvertebrates

The 10 dominant (dominance as determined by Windell, 1971) benthic macroinvertebrates for Hillsborough Bay include 7 species of polychaetes, one species of bivalves, one species of amphipod, and *Branchiostoma* spp. (Grabe, *et al.,* 1996). Site-specific benthic composition data were obtained from sampling studies conducted by the EPCHC. Applicable sampling locations include station HB36 at the mouth of the Alafia, and HB19 upstream near the Cargill berthing area. Station HB36 was sampled in 1995 and produced a total of 7 species, including 3 species of amphipods, 3 species of isopods, and one species of decapod. Station HB19 was sampled in 1993 and 1994 and produced 29 species including 17 species of polychaetes, 2 species of molluscs, 2 species of amphipods, 2 species of decapods, 2 species of echinoderms, *Enteropnuesta* spp., *Athenaria* spp., *Turbellaria* spp., and *Nemertea* spp. These species serve as an integral link of the Tampa Bay food chain, and provide nutrients for several aquatic and avian species.

It was observed that Hillsborough Bay differed from other segments of Tampa Bay in that the cephalochordate *Branchiostoma* spp. was less abundant, and that several polychaetes were significantly more abundant. Typically *Branchiostoma* spp. is a common inhabitant of relatively clean, sandy substrates. The presence of several polychaete species, especially *Mediomastus* spp. may indicate a fine, organically enriched substrate. This would agree with findings from sediment and macroinvertebrate sampling in locations adjacent to the main channel. Dominant species of polychaetes present in Hillsborough Bay include species considered to be indicators of a perturbed environments (Mote Marine, 1995; Grabe *et al.*, 1996).

Fish

Springer and Woodburn (1960) report 253 species of fishes in their study of Tampa Bay. Comp (1985) identified 125 species in Tampa Bay. EPCHC identified 36 species of fish from 88 trawls during the September/October 1993 survey period (Grabe *et al.*, 1996). The most abundant species were mojarras (*Eucinostomus argenteus* complex) (46.7%), pinfish (*Lagadon rhomboides*) (11.6%), and gaftopsail catfish (*Bagre marinus*) (7.2%). Fishes observed in the Alafia River in waters possessing greater than 10 ppt salinity include *Dasyatis* spp., *Lepisosteus* spp., ladyfish (*Elops saurus*), tarpon (*Megalops atlanticus*), *Brevoortia* spp., *Dorosoma* spp., thread herring (*Opisthonema oglinum*), scaled sardine (*Harengula jaguana*), lizardfish (*Synodus foetens*), hardhead catfish (*Arius felis*), toadfish (*Opsanus tau*), *Strongylura* spp., *Fundulus* spp., mosquito fish (*Gambusia affinis*), sailfin molly (*Poecilia latipinna*), *Menidia* spp., *Syngnathus* spp., *Prionotus* spp., *Centropomus* spp., pinfish, *Cynoscion* spp., jack (*Oligoplites saurus*), silver perch, (*Bairdiella chrysoura*), spot (*Leiostomus xanthurus*), bumper (*Chloroscombrus chrysurus*), drum (*Sciaenops ocellatus*), *Menticirrhus* spp., *Mugil* spp., flounder (*Ancyclopsetta quadrocellata*), and puffer (*Sphoeroides nephelus*) (CES, Inc., 1992). The occurrence of such a diverse assemblage of fish species indicates the importance of Tampa Bay and its tributaries as productive nursery grounds.

Hypoxic and anoxic conditions affect fish assemblage, since average species catch was lower in areas of low DO. Catfish catch was considerably higher at stations with low oxygen levels, and may implicate this species as an indicator of degraded conditions. Based on documented low DO levels in the project area and Hillsborough Bay in general, it appears this species can tolerate stressed conditions. Their presence may be based upon a shift in their prey to burrowing species. This would agree with study findings of several species of polychaetes in the study area. Other fish able to tolerate degraded water conditions include cownose ray (*Rhinoptera bonasus*), puffer, kingfish (*Menticirrhus americanus*), and lookdown (*Selene romer*), which appear almost exclusively in Hillsborough Bay (S. Grabe, pers. comm., 1996).

Birds

A total of 83 species of birds are associated with marine habitats in Tampa Bay (Dunstan and Lewis, 1974). Of significance to this project, adjacent spoil islands 2D, 3D, and the Alafia Banks provide nesting habitat for 22 species of birds, including 10 state-designated "species of special concern." According to the National Audubon Society and the Florida Game and Fresh Water Fish Commission (GFC), these spoil islands serve as important breeding areas. The Alafia Banks are one of the nation's outstanding and most diverse bird colonies, as well as being ranked as Florida's number one colony. It appears the spoil islands provide desirable nesting habitat for many species due to substrate and vegetative conditions, and absence of humans. With appropriate management, these areas will continue to serve as breeding grounds for a myriad of species.

Table 2. Breeding pairs of Alafia Bank and Tampa Port Authority spoil islands 2D and 3D for 1996 (National Audubon Society 10-96).

Species	Alafia Bank	Island 2D	Island 3D
Brown Pelican*	600		
Double-crested Cormorant	200		
Great Blue Heron	80		
Great Egret	80		
Snowy Egret*	200		
Little Blue Heron*	90		
Tricolored Heron*	230		
Reddish Egret*	45		
Cattle Egret	700		
Black-crowned Night Heron	50+		
Yellow-crowned Night Heron	50+		
White Ibis*	8100		
Glossy Ibis	525		
Roseate Spoonbill*	100		
Clapper Rail	+	+	
American Oystercatcher*	18	34	11
Willet	6+	10+	5+
Laughing Gull		500	3400
Caspian Tern			93
Royal Tern			180
Sandwich Tern			135
Black Skimmer*			320
Total Pairs	11,074	544+	4,144

*-designates state listing

Note: Gull-billed Terns and Least Terns* have nested on 2D and 3D in the past; not seen nesting there in 1996.

During Service field inspections, the following avian species were observed in the project area: brown pelicans (*Pelecanus occidentalis*), laughing gulls (*Larus atricilla*), ring-billed gulls (*Larus delawarensis*), double-crested cormorants (*Phalacrocorax auritus*), roseate spoonbills (*Ajaia ajaja*), reddish egrets (*Egretta rufescens*), tricolored egrets (*Egretta tricolor*), snowy egrets (*Egretta thula*), great egrets (*Casmerodius albus*), little blue herons (*Egretta caerula*), great blue herons (*Ardea herodias*), willets (*Catoptrphurus semipalmatus*), black-necked stilts (*Himantopus mexicanus*), ruddy turnstones (*Arenaria interpres*), white ibis (*Eudocimus albus*), glossy ibis

(*Plegadis falcinellus*), Caspian terns (*Sterna caspia*), sandwich terns (*Sterna sandricensis*), black skimmer (*Rynchops niger*), American oystercatchers (*Haematopus palliatus*), and yellow-crowned night herons (*Nycticorax violaceus*).

The Service supports the conservation of migrating birds under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703). The Migratory Bird Protection Policy (June 1994), created and implemented by the Jacksonville District of the U.S. Army Corps of Engineers and the Migratory Bird Protection Interagency Committee, provides protection to nesting migratory bird species which commonly use dredged material disposal sites, while facilitating disposal of dredged material.Included are conditions which address spoil placement activities with respect to the nesting season, and subsequent management strategies. These conditions would also apply to beneficial use areas. We believe the implementation of the policies above will adequately protect avian species in the study area.

Sea Turtles

Marine sea turtles inhabit the Gulf of Mexico, and frequent Tampa Bay to forage. Species which occur are the Atlantic Green turtle (*Chelonia mydas*), the Loggerhead *(Caretta caretta),* Kemp's ridley *(Lepidochelys kempii),* and the Leatherback *(Dermochelys coriacea*). The Service's jurisdiction over these species applies only to beach nesting. For this project, and others which impact the marine environment, the National Marine Fisheries Service must be contacted.

Manatee

The endangered Florida manatee (*Trichechus manatus latirostis*) is found within the vicinity of the Alafia channel and berthing areas. One was observed during Service site visits near the Alafia banks, along the north side of Bird Island, near channel marker 12. According to surveys conducted by the Florida Marine Institute, a small number of manatees travel north and south along the shoreline and mouth of the Alafia River year round. In the winter months, they travel between warm-water discharges at Port Sutton and Big Bend. They occur in the channel in larger numbers in the warmer months (B. Ackerman, pers. comm., 1996). Dredging and its effects on manatees are discussed further in the biological opinion.

Seagrass

Seagrass beds are important as they offer habitat to several fish species (red drum, spotted sea trout, spot, silver perch, sheepshead, and snook), invertebrates, algae, dolphin, and manatee. Historically, Tampa Bay has lost much of its seagrass as a result of dredge and fill activities, and degraded water quality associated with urbanization and industry discharges. Since 1950, losses total approximately 15 thousand acres. A recent increase has been documented, and is attributed to improved water quality (TNEP, 1996).

Seagrass beds of significant size do not exist in the immediate project area (main channel and 25 feet on either side). However, they do exist at the south sides of Sunken and Bird Islands, and north of the mouth of the river. Turbidity resulting from dredging could be a problem at the islands due to their close proximity (R. Johansson, pers. comm., 1996).

5.2 SITE SPECIFIC FISH AND WILDLIFE RESOURCES OF THE TURNING BASIN

Field work was done by Service biologists in October 1997 to evaluate and provide the most current conditions of the bay in the proposed turning basin area. Sample points were chosen based on five designs proposed by the Corps. Sampling included snorkeling the project area, photographing bottom dwelling and free-swimming motile species, and performing grab samples of bottom sediments and sessile crustaceans. Most sampling points were located in shallow water outside the channel because of the unsafe diving conditions in the channel. Sampling points are shown in Figure 7. Points 1, 2, 3, and 6 cover basin plans 2, 3, 4, and 5 (figures 8-11), and are located north and west of the current turning basin, in a lagoon north of the shipping channel (figures 12, 13). Sample points 4 and 5 cover plan 1 (Figure 14), and are located upstream, near the existing basin (figures 15-17).

Sample points 1 and 2 were identical in biological community composition. The more common species of invertebrates and vertebrates were observed such as: polychaetes (*Mediomastus* spp.), moon shells (*Lunatia heros*), Florida crown conchs (*Melongena corona*), shark eyes (*Neverita duplicata*), hermit crabs (*Pagurus* spp.), sting rays (*Dasyatis americana*) and hognose rays (*Rhinoptera bonasus*). Birds observed include great egrets (*Casmerodius albus*), great blue herons (*Ardea herodias*), and brown pelicans (*Pelecanus occidentalis*). An unidentified filamentous green algae also occurred sporadically throughout the lagoon. The average water depth increased offshore at sample point 2 from minus 2 feet to 4 feet.

A small area of bay bottom near sample point 1 has been experimentally planted with shoalgrass (*Halodule wrightii*), by Tampa Baywatch and the U.S. Fish and Wildlife Service to determine the viability of seagrass recruitment in the lagoon adjacent to the fertilizer plant. To date, a 20 percent success rate has been observed. In light of the natural recolonization in that area of the bay, establishment is expected.

Sample point 3 covers basin plan 5, and encompasses the entire west and south shoreline of disposal area "C'. This area is a biologically diverse and productive shoreline (figures 18, 19). Shallow tidal habitat grades into subtidal, followed by saltmarsh and mangrove. Several black mangroves (*Avicennia germinans*) fringe the shore, with marsh elder (*Iva frutescens*),

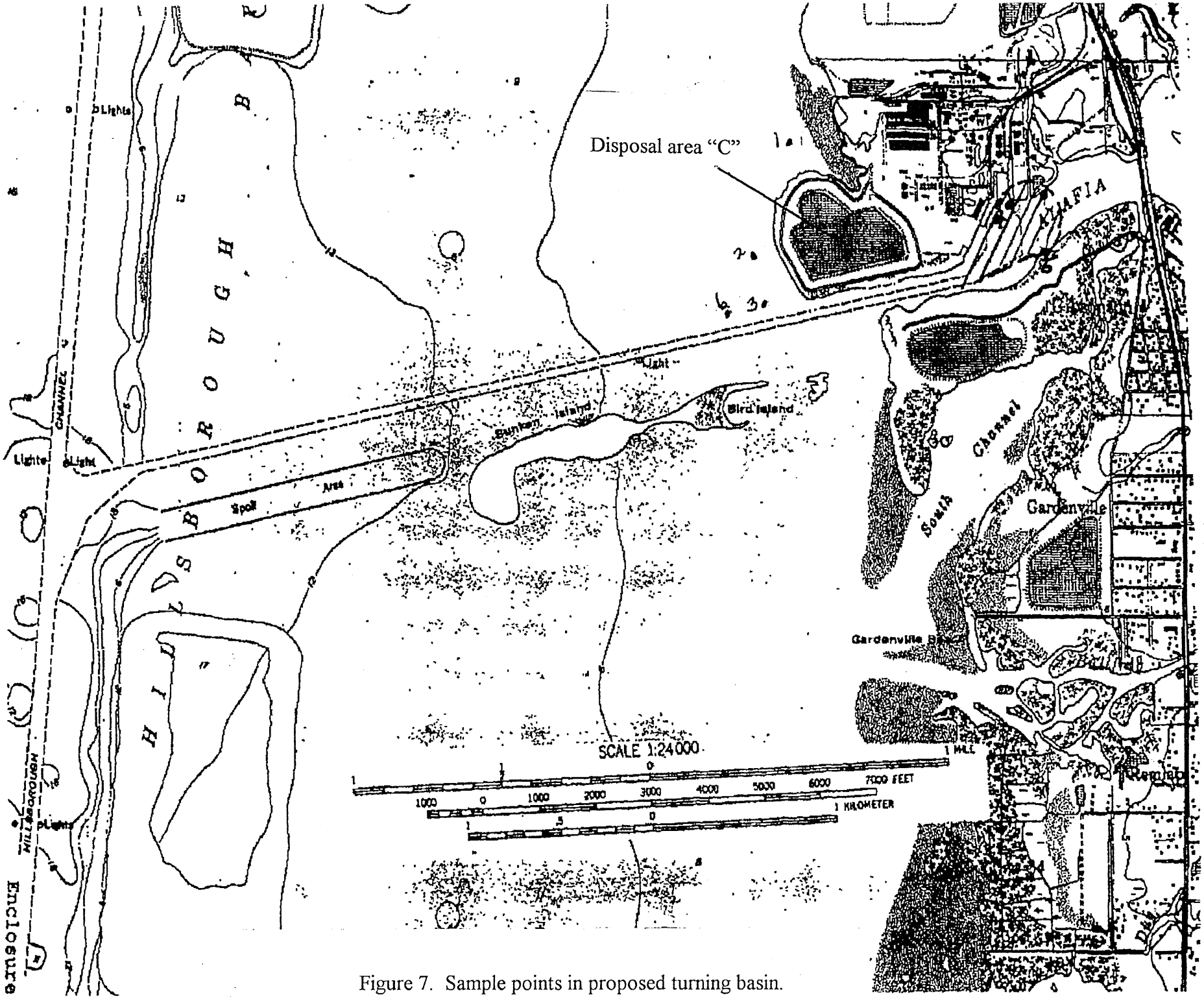


Figure 7. Sample points in proposed turning basin.

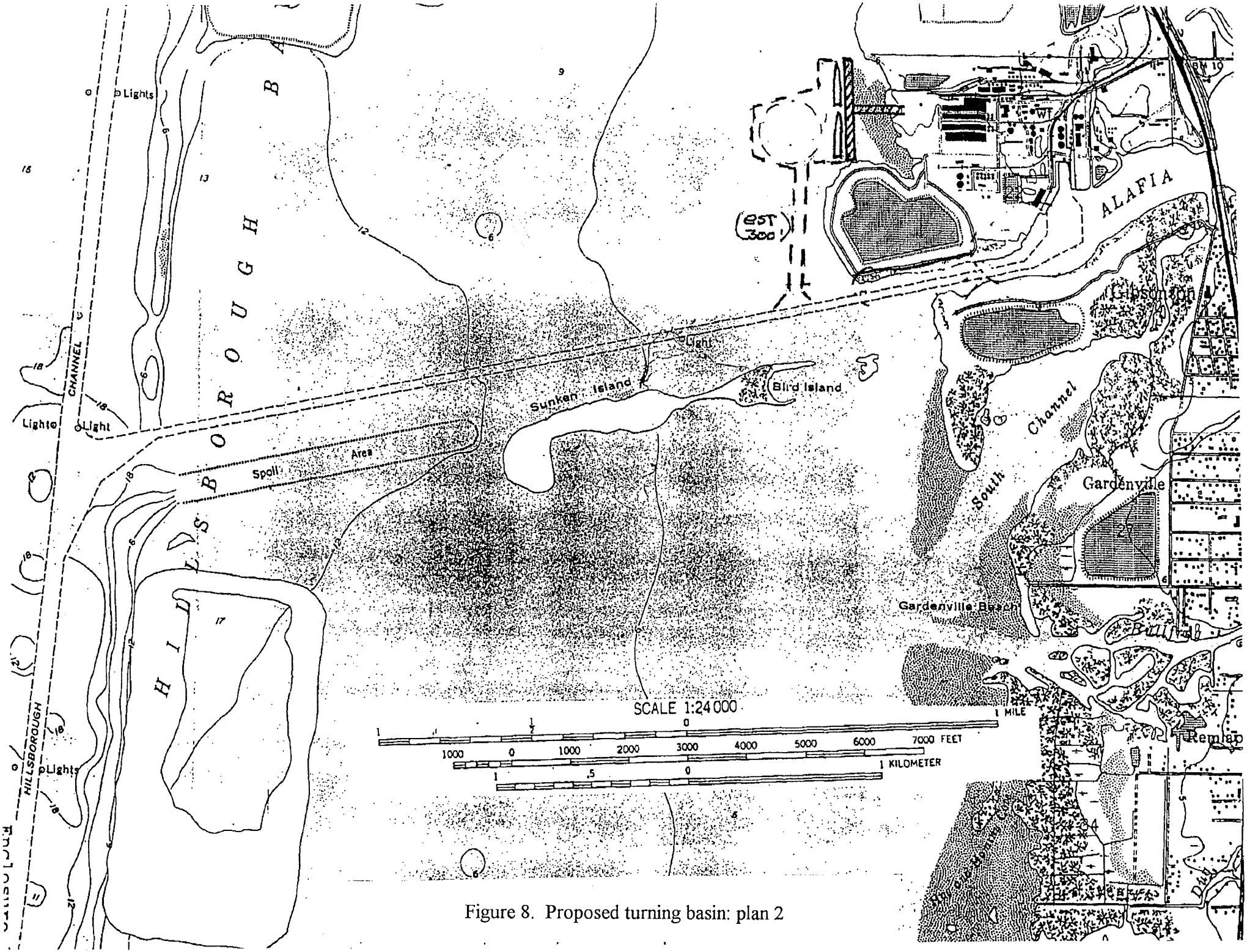


Figure 8. Proposed turning basin: plan 2

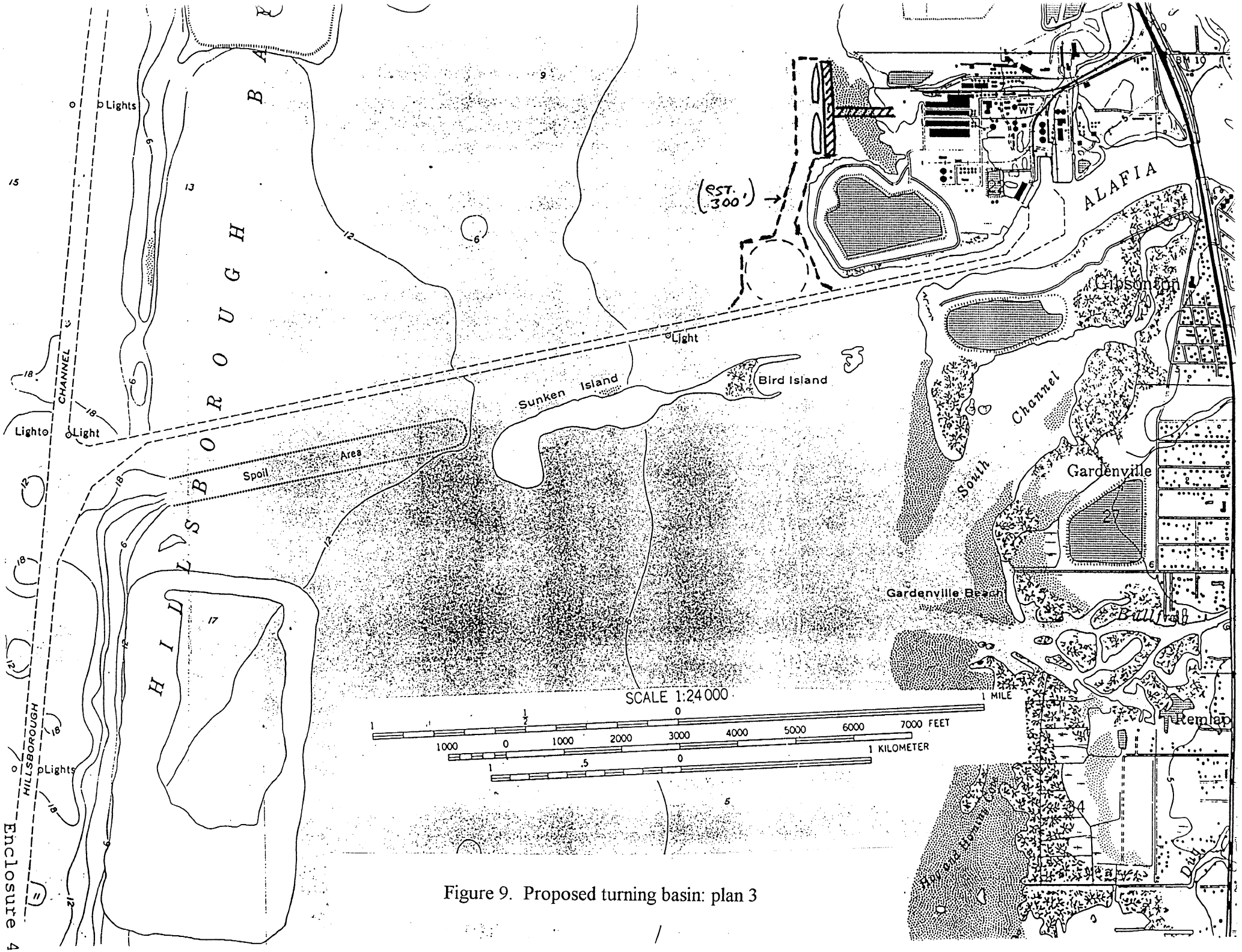


Figure 9. Proposed turning basin: plan 3

Enclosure 4

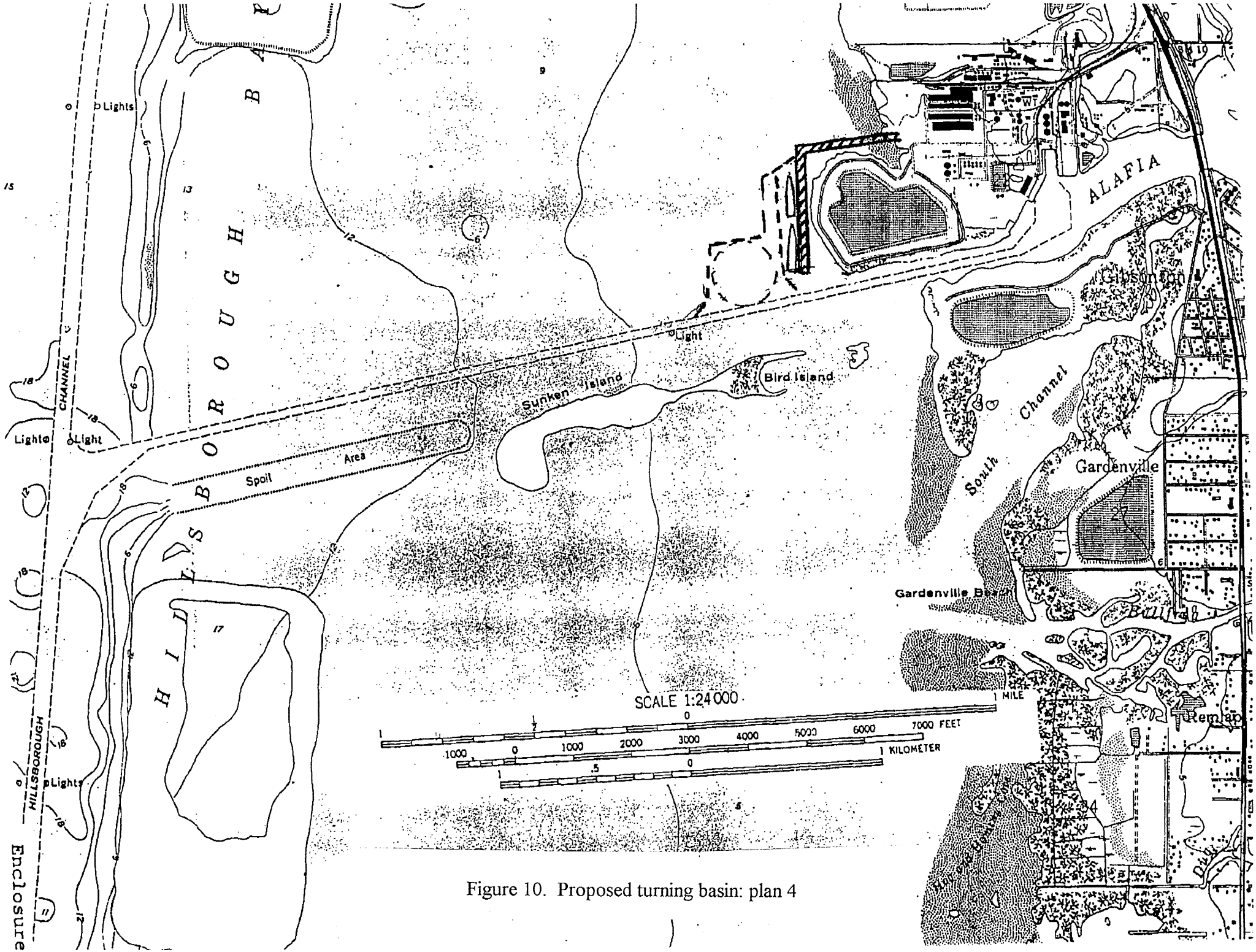


Figure 10. Proposed turning basin: plan 4

Enclosure

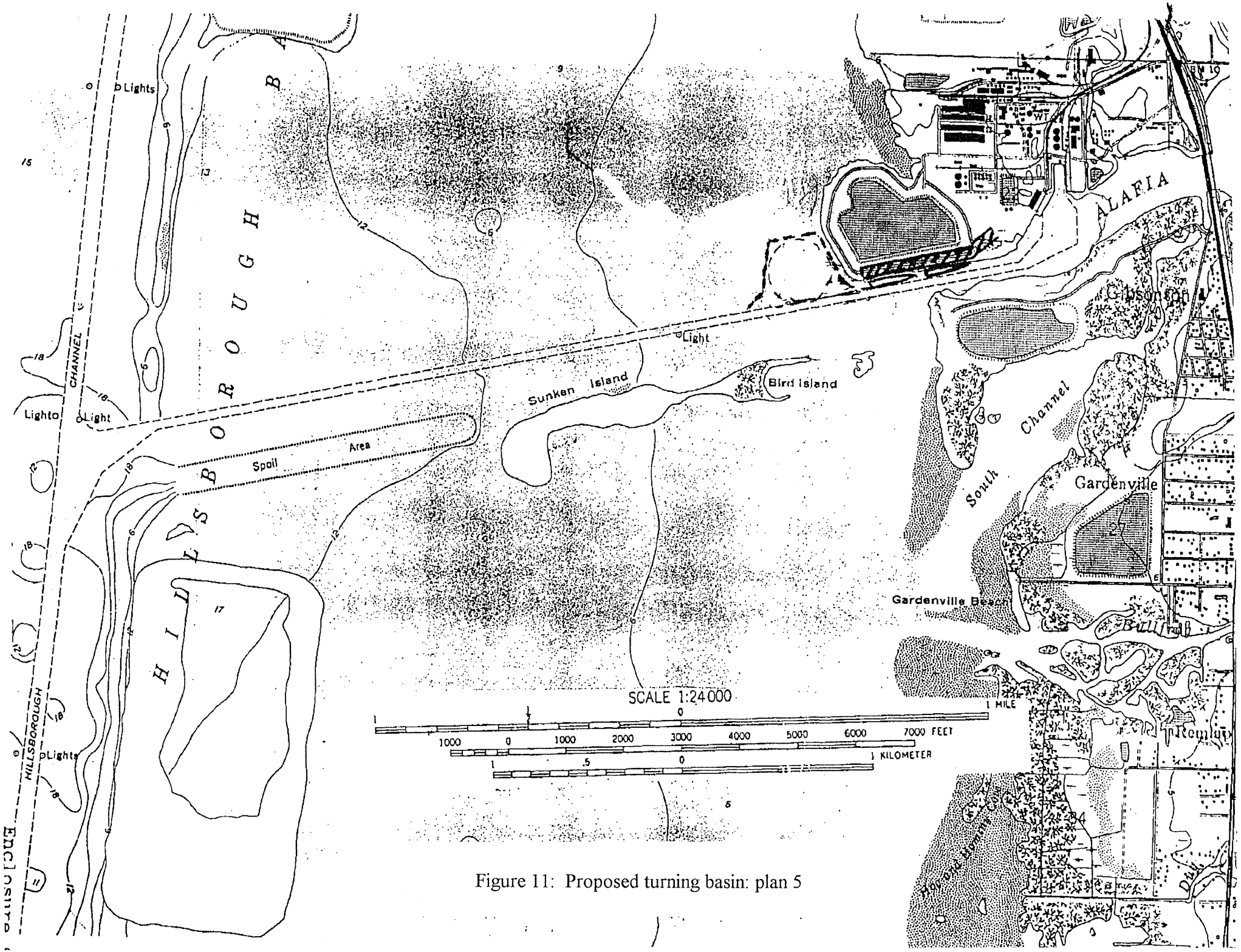


Figure 11: Proposed turning basin: plan 5

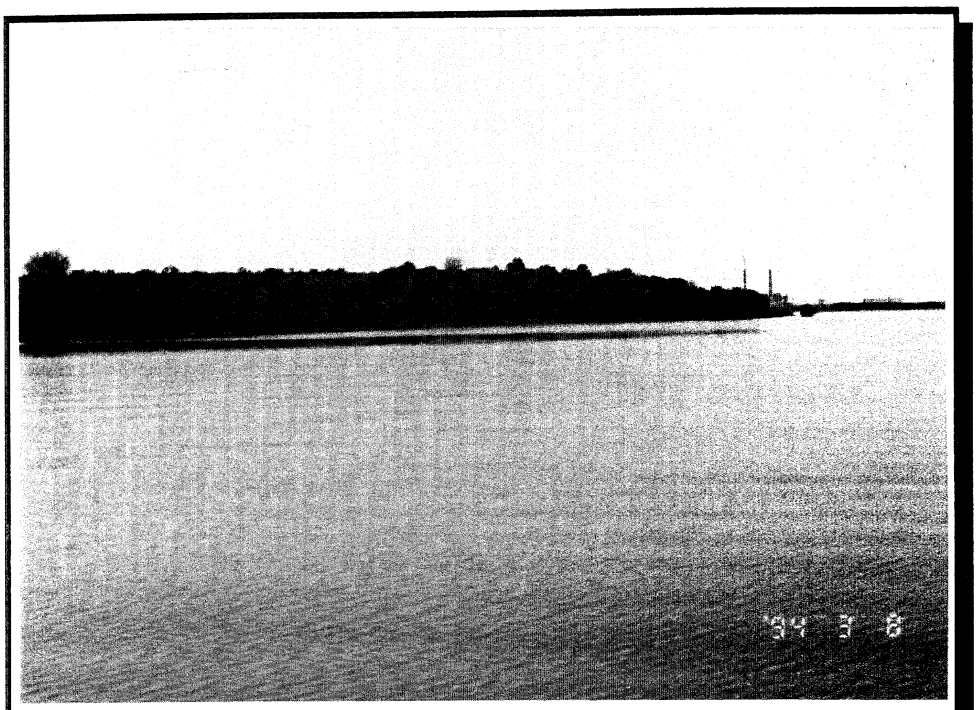


Figure 12. Cove north of disposal area "C"

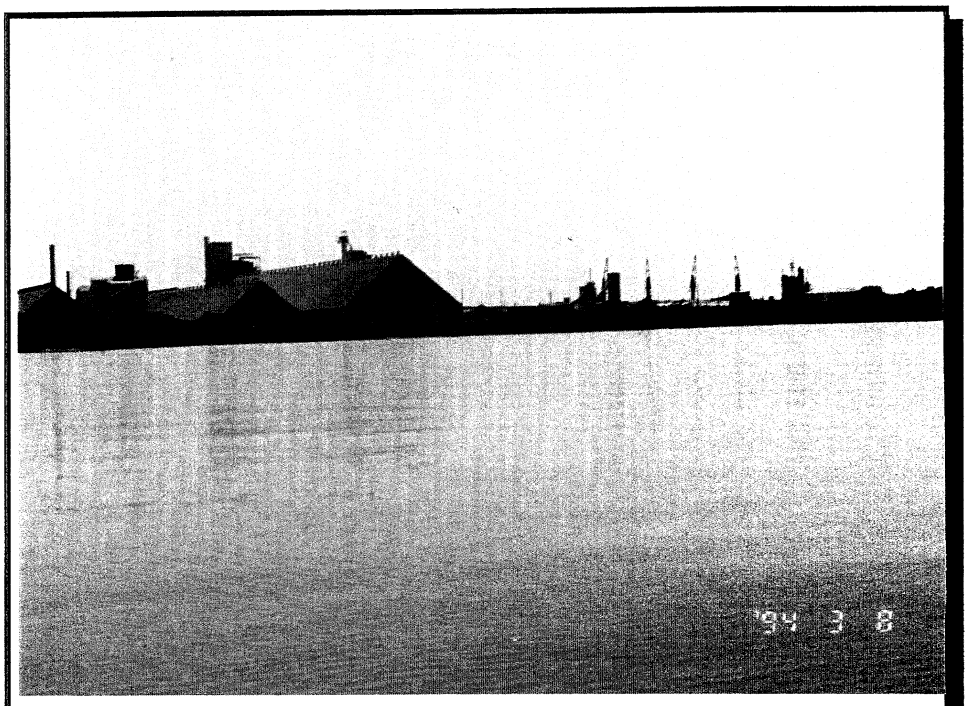


Figure 13. West of disposal area "C"

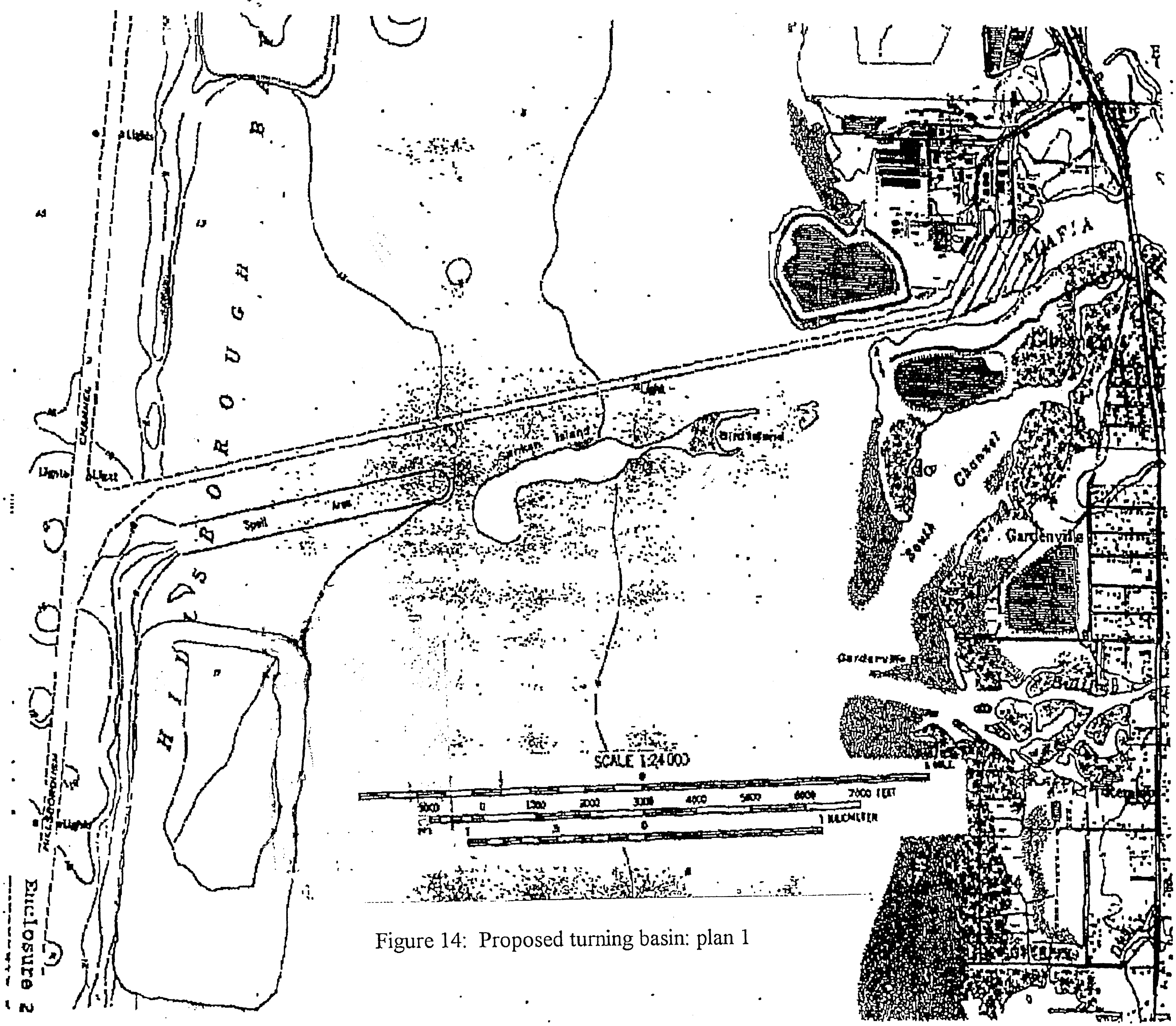


Figure 14: Proposed turning basin: plan 1

Enclosure 2

Figure 15. Existing turning basin - north view

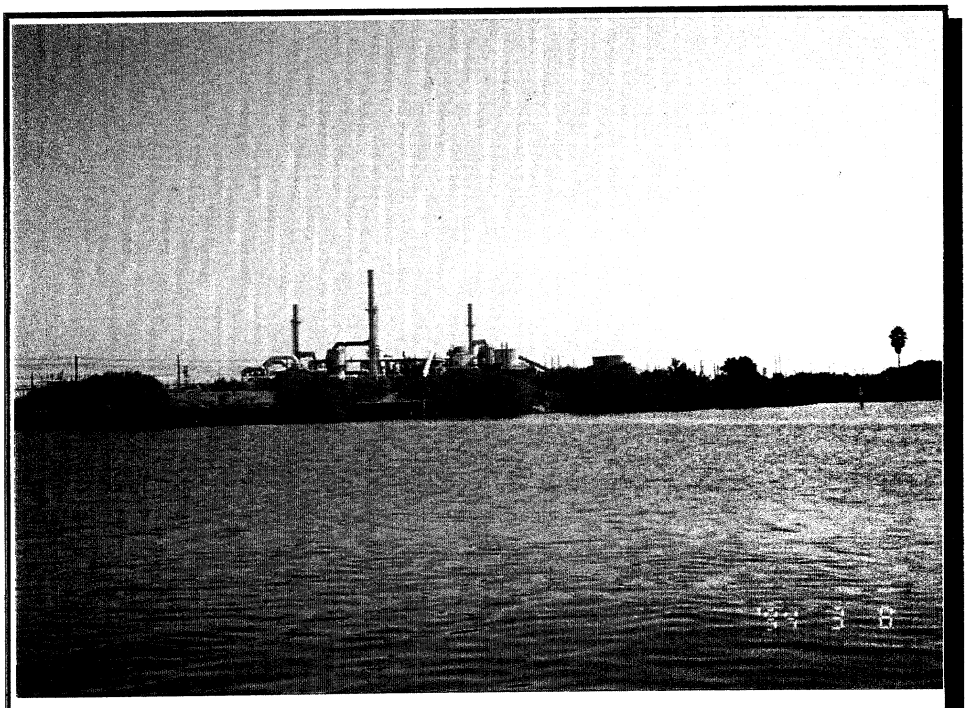


Figure 16. Existing turning basin - east view

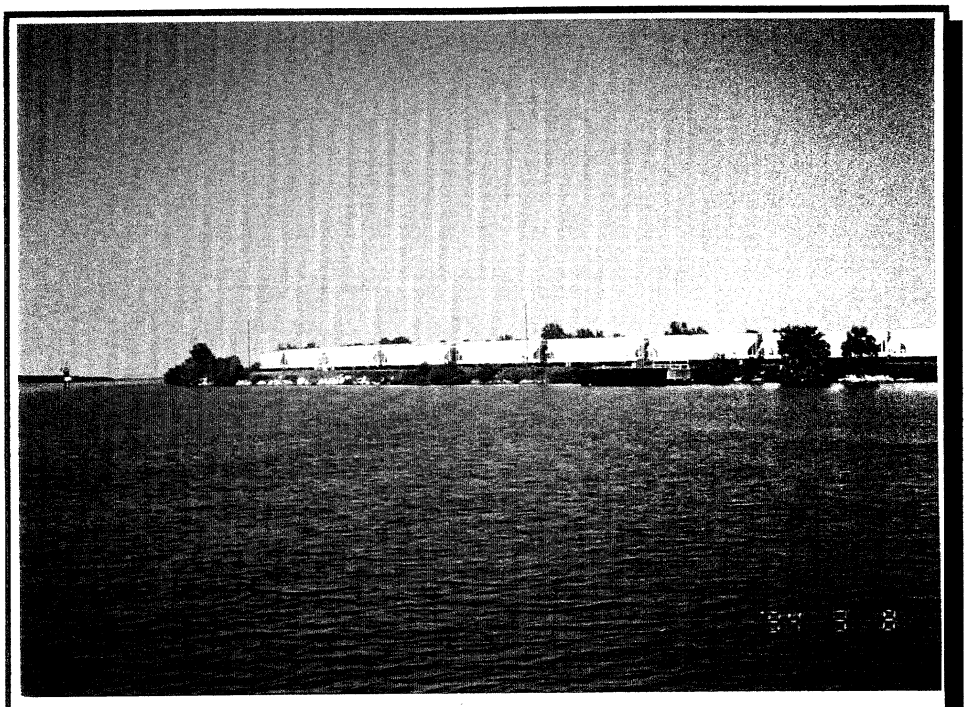


Figure 17. Existing Turning basin - west view

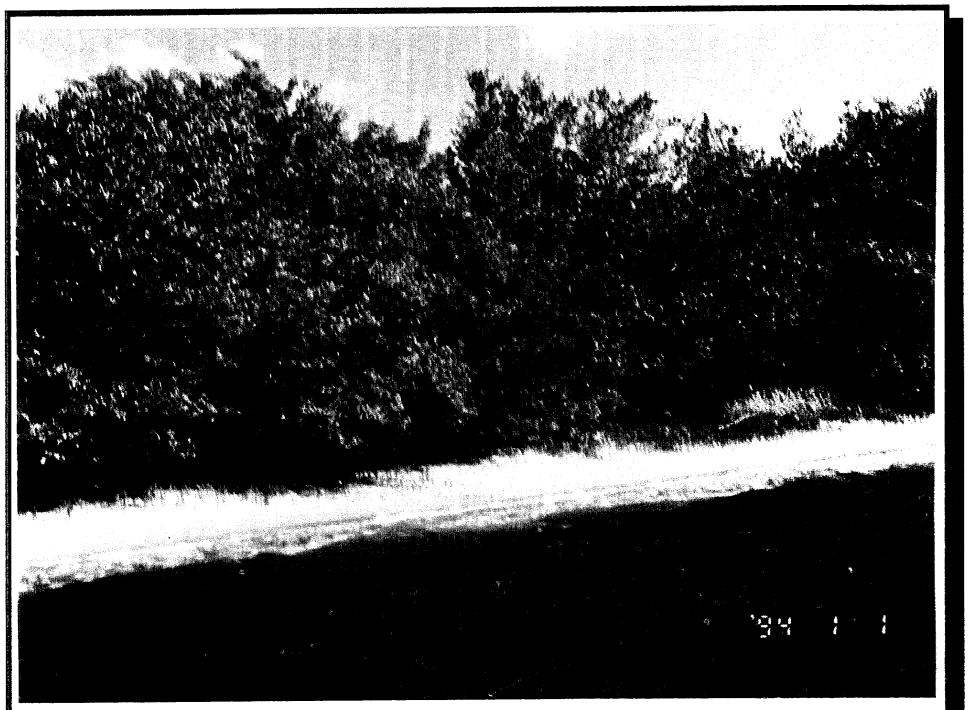


Figure 18. Sample point 3 - Black mangroves (*Avicennia germinans*), Brazilian pepper (*Schinus terebinthifolius*), and saltmeadow cordgrass (*Spartina patens*).

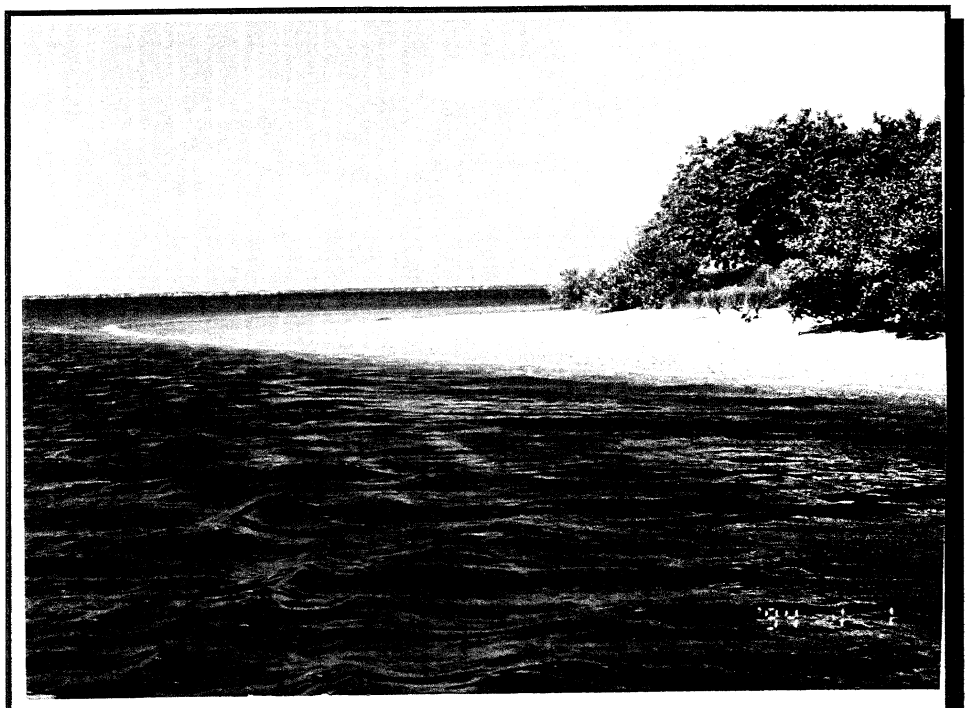


Figure 19. Sample point 3 - sand spit and marsh/shrub community - west view

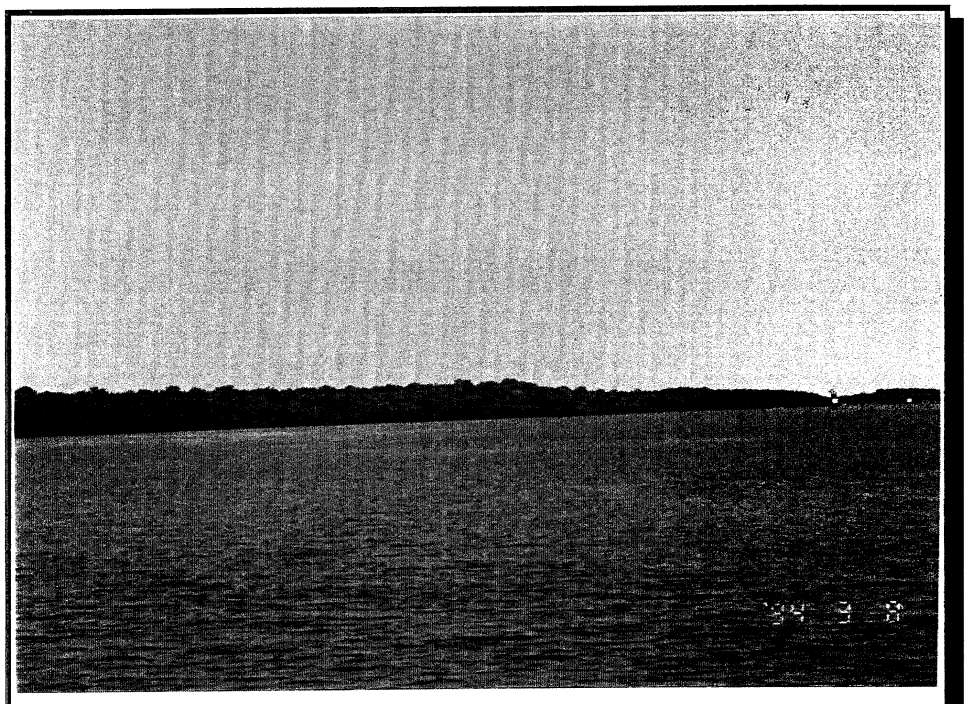


Figure 20. Shoreline of Oyster Bar Restoration Project - across channel from existing turning basin - south view

and Brazilian pepper (*Schinus terebinthifolius*) shrubs. An abundance of eastern oysters (*Crassostrea virginica*) were observed on mangroves. A small portion of low and high marsh exists at the southwest point of disposal area "C", and is vegetated with saltmarsh cordgrass (*Spartina alterniflora*), and saltmeadow cordgrass (*Spartina patens*). Fiddler crabs (*Uca* spp.) were also abundant, and occupied the entire length of beach. Killdeers (*Charadrius vociferus*), terns (*Sterna* spp.), turkey vultures (*Cathartes aura*), and few wading birds were observed on the beach.

The most western sample point (number 6) covers basin plans 3, 4, and 5. Depths were minus 4-6 feet, and displayed similar habitats found at points 1, 2, and 3. However, there appeared to be less diversity, as only worms and a few molluscs were observed.

Sample points 4 and 5 cover basin plan 1, which provides for the expansion of the existing turning basin. It is located approximately 1 mile upstream from the mouth of the river, across from the Oyster Bar Restoration Project being undertaken by the Florida Department of Environmental Protection (figure 20). The shoreline is narrow, and vegetated with red (*Rhizophora mangle*) and black mangroves, and Brazilian pepper shrubs. Oysters were evident in the roots of the mangroves, but in less numbers than sample point 3. Behind the vegetated strip are terminal buildings, where associated loading/offloading and manufacturing operations occur (figures 21, 22). Large ship operations in the confined waterway create strong wake on both sides of the channel, which has eroded some areas along the southern shoreline. Water clarity was poor, which precluded benthos identification.

As mentioned above, a restoration project is underway on the south shore, across from the current basin. This was once a dredge disposal area for the Cargill plant, and now harbors a revitalized fringe mangrove and saltmarsh tidal creek system. Oysters have begun to colonize the surrounding flats. Brazilian pepper has been eradicated from portions of the area. Conditions for full restoration appear favorable at this time.

Seagrass beds do not exist in the proposed basin areas (exclusive of the experimental plot); however, they do exist at the south sides of Sunken and Bird Islands, and north of the mouth of the river. Dredging and/or construction activities to occur in the Alafia channel harbor should incorporate measures to avoid turbidity, which could kill or stunt existing grasses, or prevent establishment of new growth.

The substrate in sample points 1- 6 consisted of silty, organic sediments, with some areas possessing more organics (Figure 23). Water clarity was moderate to poor in deeper areas. Water color was golden-brown (Figure 24). This was attributed to the recent flooding and cresting of the Alafia River from recent amounts of unusually high rainfall.

In summary, this area consists of silty, organic sediments, and elevated contaminant content. We recommend a more thorough investigation of the sediments to be dredged. This will allow thorough evaluation of the suitability of these sediments for beneficial uses.

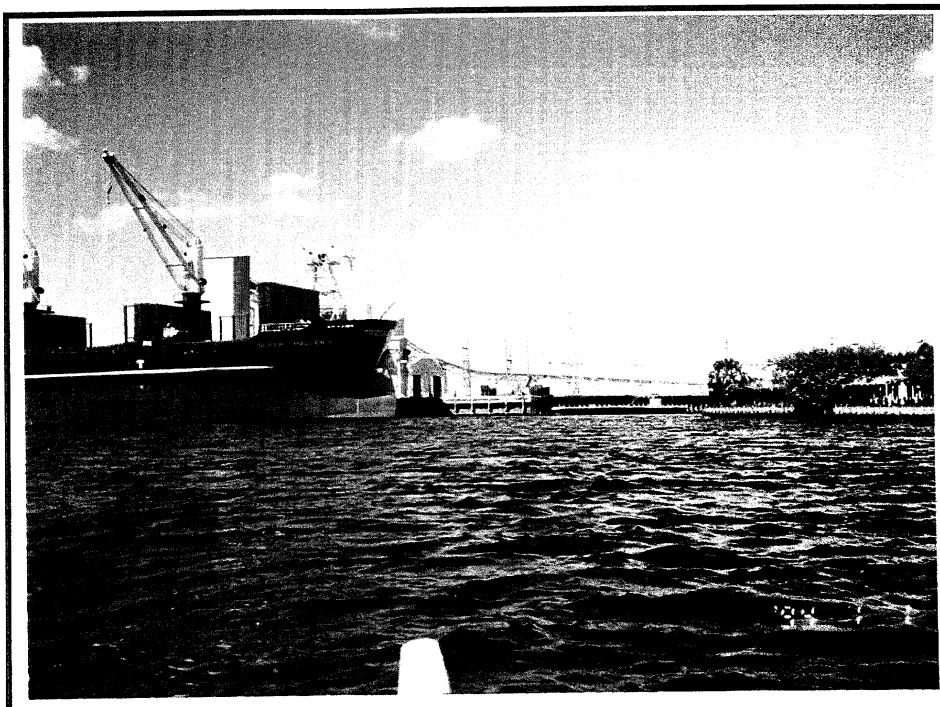


Figure 21. Shoreline and shipping infrastructure of existing turning basin.

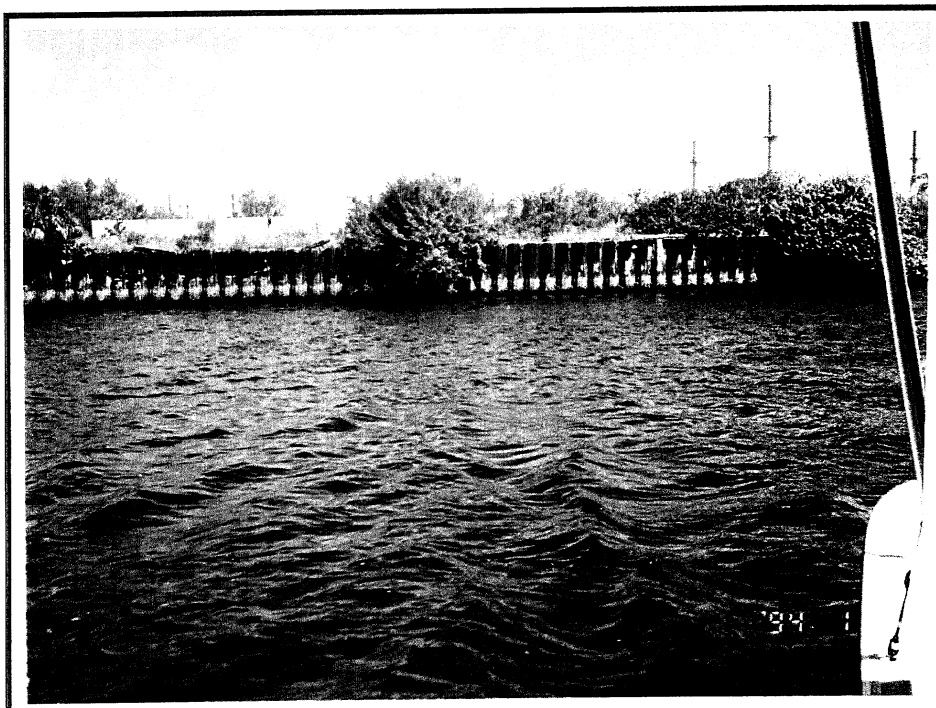


Figure 22. More supporting infrastructure at basin.

Figure 23. Typical sediment sample from sample points 1-6.

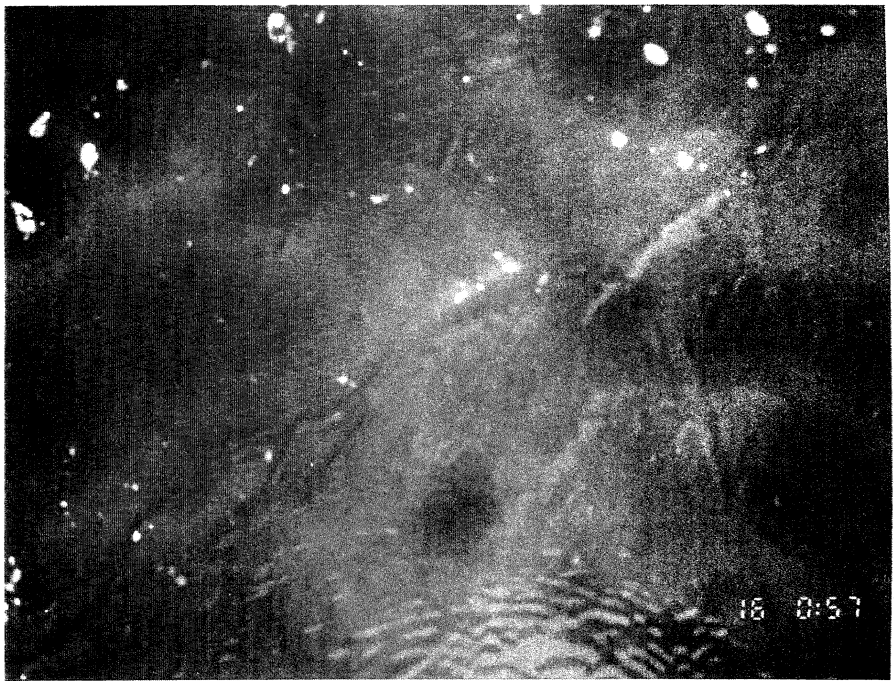


Figure 24. Tannins in Tampa Bay waters.